SCIENTIFIC BROCHURE

FESIA WALK

fesia

The use of FES technology in neurorehabilitation

Functional Electrical Stimulation (FES) artificially stimulates motor nerves to elicit muscle contractions and thus, restore motor function.

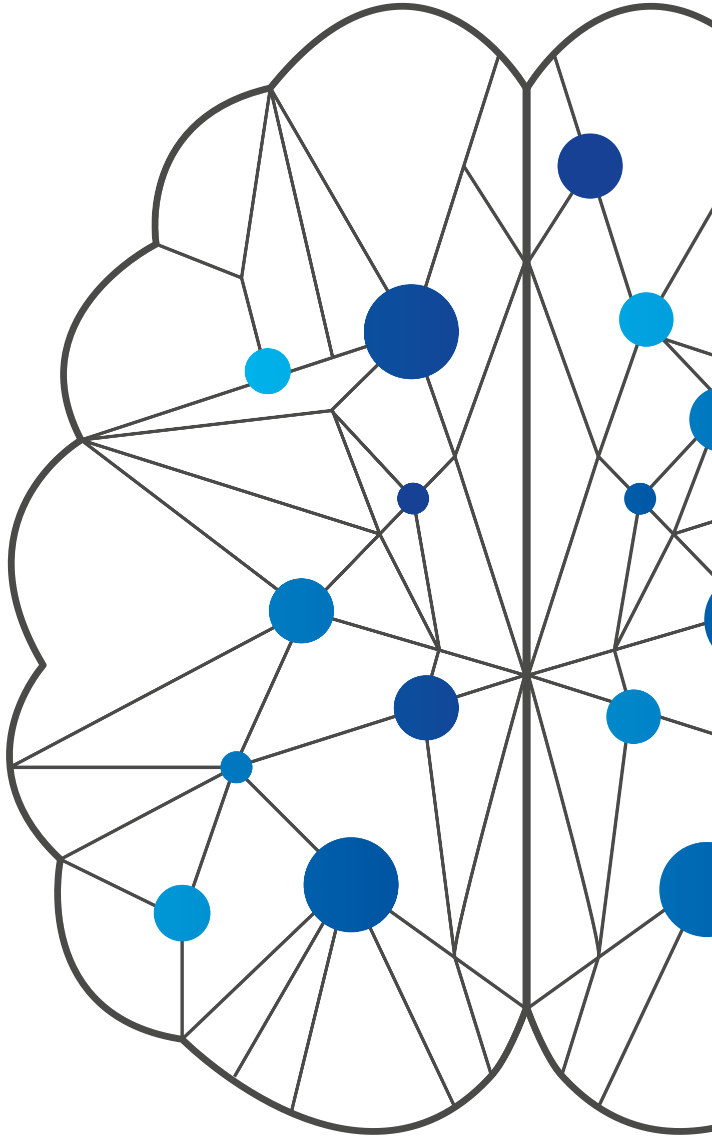
It has been used for rehabilitation purposes for more than 50 years [1], showing highest evidence of benefits such as:

- Avoidance of muscle disuse atrophy [2].
- Maintenance of ranges of motion [3].
- Increase of local blood flow [4].
- Even therapeutic effects in terms of regaining of motor functions [5].

Neural repair

Studies have shown that FES stimulates the central nervous system, achieving improvements in different neurophysiological parameters:

- Increase in mean-absolute, root-mean-square and improved the surface electromyography power during maximum voluntary contractions [6].
- It strengthens voluntary pathways and changes some reflexes towards control values [7].
- Activation of motor cortical areas and their residual descending connections [8].
- Interlimb cutaneous inputs may access coordinated reflex pathways [9].
- It reverses axonal dysfunction [10].
- Change in reflex size to various degrees [7].
- Cortical tract excitability increase [7].



FES for the treatment of foot drop

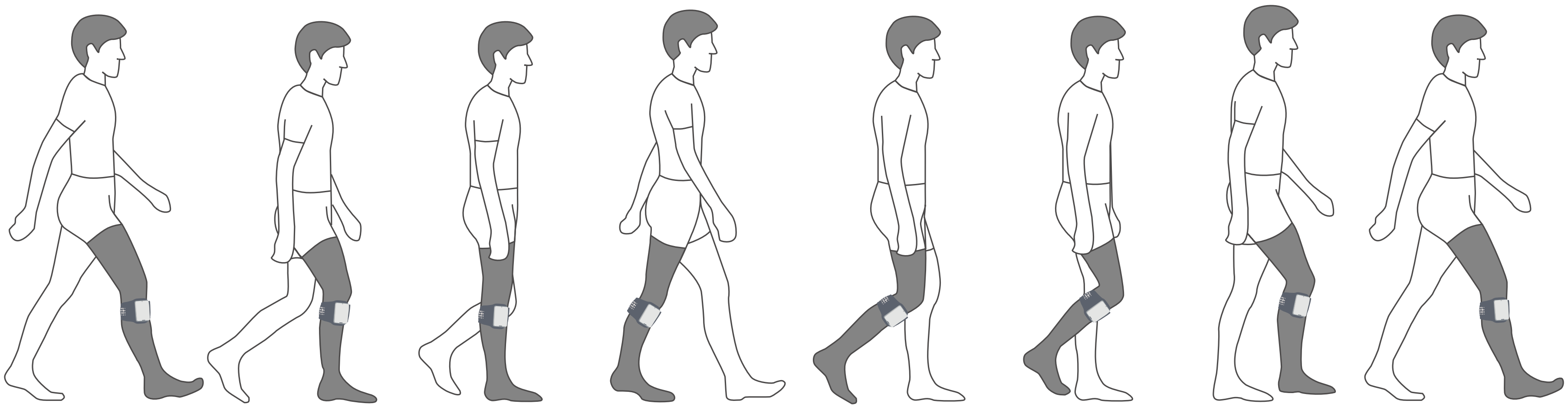
Lower limb therapy with FES has shown positive results in many parameters, improving people's quality of life.

More than 70 clinical trials have been carried out.

Improvements have been seen in biomechanical, functional and neurophysiological parameters.

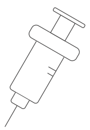
Effects:

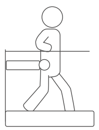
- 38,7% increase in gait speed [6].
- Improvement in neurophysiological indicators [6].
- Increased dorsal flexion and swing phase time [11].
- 56,5% increase in dorsiflexor muscles strength [6].
- 38,3% decrease in plantar flexor muscles spasticity [6].
- Decreased joint pain [12].
- Biomechanical improvements in the least affected leg and in arm swing angle [13, 14].

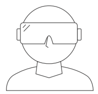


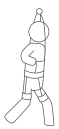
FES: Combinable with multiple therapies

FES therapy has been extensively studied, also in combination with other therapies:


Botulinum toxin


Robotics


Virtual reality


Treadmill with body weight support


Cycling


Mirror therapy

Clinical practice guidelines

The rehabilitation of the lower limb with FES is supported by prestigious international scientific societies, showing optimal levels of evidence:

NICE
National Institute for Health and Care Excellence

"Current evidence on the safety and efficacy (in terms of improving gait) of FES for drop foot of central neurological origin appears adequate to support the use of this procedure".

"FES can have a positive orthotic effect, particularly for gait speed and physiological cost index, in persons who were in the chronic stage of stroke recovery".

Chest Heart & Stroke Scotland

Fesia Walk: the latest technology for gait rehabilitation based on scientific evidence

Fesia Walk has a very strong scientific background:

10 works including 37 persons using **Fesia** Walk have been published.

Our findings:

A single-blind randomized study with 16 post-acute persons held in Belgrade (Serbia) showed that:

- **Fesia** Walk combined with conventional rehabilitation is more effective on walking speed, mobility of the lower extremity, balance disability and activities of daily living compared to a conventional rehabilitation program only.
- **Fesia** Walk is effective both in acute and chronic persons with stroke related foot drop [15].

A usability study carried out with 10 persons in a clinical environment in Pamplona (Spain) showed that:

- It is feasible to include surface multi-field technology while keeping the device simple and intuitive for successful integration in common neurorehabilitation programs.
- All the participants were very satisfied with the **Fesia** Walk device in terms of usability [16].

Use cases:

JM. an **84-year-old male** person has a **severe polyneuropathy** caused by a paraneoplastic syndrome, which produced an **absence of motor capacity in the muscles below the knee**. After **6 weeks of treatment** with **Fesia** Walk, JM. can **activate his muscles voluntarily**, has increased his **walking speed by 30%** and has **stopped using his walking stick**.

Fesia Clinic, San Sebastian, Spain.

EP. a **35-year-old male** person has a **peripheral neuropathy** caused by a displaced tibial plateau fracture, which produced an **absence of motor capacity in the dorsiflexors muscles**. After **2 months** of intensive treatment with **Fesia** Walk, EP. has **improved his neurophysiological records**, beginning to **activate his dorsiflexor muscles** during gait.

TDN Clínica, Pamplona, Spain.

ML. suffered a severe sensitive **bilateral polyneuropathy** as a result of chemotherapy treatment, which made her **impossible to perform many activities of daily living**. After a treatment protocol with **Fesia** Walk, great **results** were achieved regarding her **sensitivity impairment**, improving **discrimination** and **reducing secondary sensitive effects** of chemotherapy treatment.

Fesia Clinic, San Sebastian, Spain.

MC. a **71-year-old female** person suffered a **ischemic stroke** that produced an **hemiplegia on her left side**, affecting predominantly the **mobility of her ancle**. After **8 weeks of intensive treatment** with **Fesia** Walk, MC has gone from not being able to go outside alone, to **walking for 90 minutes every day**.

Fesia Clinic, San Sebastian, Spain.

Ongoing:

We have received approval from the ethics a clinical trial with 30 stroke persons at the Ubarmin Clinic in Pamplona (Spain).

References

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